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THE TOXICITY OF HERBICIDES TO MAMMALS, AQUATIC LIFE, SOIL MICROORGANISMS, BENEFICIAL INSECTS AND CULTIVATED PLANTS, 1950 - 65

A List of Selected References

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PREFACE

The Toxicity of Herbicides to Mammals, Aquatic Life, Soil Microorganisms, Beneficial Insects and Cultivated Plants is the second in a series of special bibliographies compiled by Patricia A. Condon for the Pesticides Information Center, National Agricultural Library.

For the purpose of this bibliography, "toxicity" is broadly interpreted to mean an unusual effect of an herbicide on a plant or animal. However, especially in the section on mammalian toxicity, articles are included even when the herbicide studied has had no discernible effect on an animal.

Whenever possible, chemicals are designated by their common name as approved by the Weed Society of America's Terminology Committee.

Toxicity data for many herbicides are available in unpublished reports. These report have been cited only when there is a published abstract of the material which they contain.

Annotations have been added to a citation only when necessary to clarify the title.

All references except those marked with an asterisk (*) were examined by the compiler

The American Standard for Periodical Title Abbreviations, issued in 1964 by the American Standards Association, is the authority used for abbreviations. The abbrevi tion "Ref." indicates that the item contains at least ten references to other literature.

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TOXICITY OF HERBICIDES
1950-1965
A List of Selected References

Compiled by
Patricia A. Condon
Pesticides Information Center
National Agricultural Library

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Vegetables.

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Carrots, vegetables, and weeds.

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Peas and barley; atratone, CIPC, IPC, and sodium salts of MCPA, 2,3,6-TBA, DNC, and TCA.

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CIPC, CDEC and EPTC.

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Kidney-beans, tomatoes, spinach, corn and barley.

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Tomatoes.

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Chlorophenoxy herbicides.

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Monuron, Stoddard solvent, PCP and NPA.

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Includes 2,4-D, MH, IPC, TCA, and dalapon.

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Simazine, propazine, trietazine and atrazine.

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English summary.
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NPA, diuron, CDEA, EPTC, dalapon, CDEC, and 2,4-DEP.

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Dalapon, NPA, sesone, 2,4,5-TES, and amitrole.

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Propazine, chlorazine, and alipur.

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Includes 2,4,5-T, MCPA, and 4-chlorophenoxyacetic acid.

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DNBP, CIPC, sodium PCP, NPA and 2,4-D.

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S. R. McLane, R. D. Hart, and H. L. Ramen, joint authors.
Amiben, 2,3,6-TBA, 3-nitro-2,5-dichlorobenzoic acid (dinoben), 2,5-dichlorobenzoic acid, 2,3,5-trichlorobenzoic acid, 6-nitro-2,5-dichlorobenzoic acid, and 6-amino-2,5-dichlorobenzoic acid.

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Red beets, beans, carrots, cucumbers, lettuce, spinach, sweet corn, cabbage, and tomatoes.

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Includes effects of 2,4,5-T.

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Sodium arsenite.

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CIPC, 2,4,5-TES and chlorazine.

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Dalapon, EPTC, DNBP, simazine, neburon, NPA, 2,3,6-TBA, CDAA, diuron, monuron, and amitrole.

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Effect of herbicides.

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Review of symptoms in vegetables caused by MCPA, 2,4-D, mecoprop, 2,4,5-T, and 2,3,6-TBA spray drift.

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Lettuce, cabbage, cauliflower, Brussels sprouts, carrots, parsnips, French and broad beans, red beets, spinach, turnips and onions.

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R. Taylorson, F. Gilbert, M. Dana, and L. Holm, joint authors.
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Some tests with IPC and 2,4,5-T.

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Fruits

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Lemon, orange, and grapefruit.

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Lemon, orange, and grapefruit.

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2,4-D.

1418. LEGGETT, H. W. The effect of chemicals on legumes. West. Can. Weed Contr. Conf. Proc. 4:34-44. 1951. 79.9 W522
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English summary.
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Sesone.

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Monuron.

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Injury from spray and drift.

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Woody ornamentals.

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2,4-D, silvex and 2,4-DB.

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Effects on germination of grass seed of phenyl mercury compounds, 2,4-D, and potassium cyanate in crabgrass killers.

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stock to CMU and SES. (Abstr.) N. Cent. Weed Contr. Conf. Proc. 12:52. 1955. 79.9 N81
Monuron and sesone.
Norway spruce, Japanese maple, dogwood, Taxus, forsythia and marigold.

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Thesis (Ph.D.) - Colorado State University.
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H. H. Harris, T. L. Curry, and L. G. Utter, joint authors.

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B. R. Fleming, A. E. Dudeck, and G. J. Shoop, joint authors.
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Includes chlordane, zytron, and calcium arsenate.

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Includes herbicide injuries to turf.

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Thesis (Ph.D.) - Michigan State University.
In Diss. Abstrs. 24(2):456-457. Aug. 1963. 241.8 M58.

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DMPA, DCPA, Bandane, chlordane, and DSMA.

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English summary.

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Low volatile esters of 2,4-D and 2,4,5-T in water or oil-in-water tested on Douglas firs and Ponderosa pines.

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Toxicity to ornamentals with list of species which are susceptible, intermediate, and resistant.

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White spruce, Colorado spruce and Scotch pine.

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2,4-D toxicity.

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Through wind-drift and residue of 2,4-D in sprayer.

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Includes atrazine, amiben, CIPC, 2,4-DES and diuron.

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Includes diuron, monuron, CIPC, paraquat and dalapon.

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Seedlings of red pine, white pine and white spruce.

1631. JACOBS, H. L. 2,4-D, friend or foe. Nat. Shade Tree Conf. Proc. 26:23-30. 1950. 99.9 N218
Injuries to trees and shrubbery from over-use and misuse of 2,4-D and 2,4,5-T.

1632. JAGSCHITZ, J. A., and SKOGLEY, C. R. Preemergence and broadleaf herbicide effects on turfgrass establishment. Neast. Weed Contr. Conf. Proc. 19:580-586. 1965. 79.9 N814
Effects of Azak, 64-125, bandane, betasan, DCPA, DMPA, tupersan, dicamba, 2-(MCPP), 2,4-D, 2,4,5-T, silvex, and picolinic acid on turfgrass seeding and seedlings.

1633. JONES, R., and BINGHAM, S. W. Effects of dichlobenil on various ornamental species. South. Weed Conf. Proc. 18th Annu. Meeting:212-221. 1965. 79.9 S08
Injuries.

1634. JUSKA, F. V., and HANSON, A. A. Effect of preemergence crabgrass herbicides on seedling emergence of turfgrass species. Weeds 12(2):97-101. Apr. 1964. 79.8 W41
DCPA, calcium arsenate, lead arsenate, DMPC, chlordane, and and arsenic complex.

1635. JUSKA, F. V. Effects of several pre-emergence crabgrass chemicals on germination and growth of some turfgrasses. Agron. Abstrs. 1959:89-90. 241 Am39
Chlordane, lead arsenate, calcium arsenate, arsenic complex, and fenac.

1636. JUSKA, F. V. Pre-emergence herbicides for crabgrass control and their effects on germination of turfgrass species. Weeds 9(1):137-144. Jan. 1961. 79.8 W41
Chlordane, calcium arsenate, lead arsenate, fenac, and DSMA.

1637. KOZLOWSKI, T. T., and KUNTZ, J. E. Effect of simazine on red pine seedlings of varying age. Forest. Res. Notes 62, 3 p. Nov. 1960. 99.8 F76292.

1638. KOZLOWSKI, T. T., and TORRIE, J. H. Effect of soil incorporation of herbicides on seed germination and growth of pine seedlings. Soil Sci. 100(2): 139-146. Aug. 1965. 56.8 So3
CDEC, DCPA, EPTC, CDAA, ipazine, propazine, prometryne, simazine and atrazine effects on red pine.

1639. KOZLOWSKI, T. T. Effect of surface application and soil incorporation of herbicides on seed germination and growth of red pine seedlings. Forest. Res. Notes 101, 4 p. Nov. 1963. 99.8 F76292
EPTC, simazine, CDEC, DCPA, and CDAA.

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Includes white spruce and Norway spruce.

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Red pine and white pine.

1642. KOZLOWSKI, T. T. Influence of temperature on susceptibility of red pine seedlings to simazine. Forest. Res. Notes 128, 5 p. Ref. Oct. 1965. 99.8 F76292.

1643. KOZLOWSKI, T. T. Variable toxicity of triazine herbicides. Nature (London) 205(4966):104-105. Jan. 2, 1965. 472 N21
Effects of simazine, atrazine, propazine, prometryne and ipazine on Pinus-resinosa seedlings.

1644. KRAGTWIJK, C. J., and JONGKIND, M. Chemical weed control. (DU) Aalsmeer. Proefsta. v. de Bloemisterij. Jaarverslag 1962:65-68. 1963. 86 Aa4
Injuries to chrysanthemum by CIPC, simazine, and amiben.

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propazine, and Alipur on growth and development of jack pine. Forest. Res. Notes 91, 3 p. 1963. 99.8 F76292.

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Diuron, dichlobenil, simazine, and atrazine.

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Screening 52 herbicides.

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Annual and perennial plants.

1651. LEVI, E. and CRAFTS, A. Toxicity of maleic hydrazide in California soils. Hilgardia 21(16):431-463. Ref. Aug. 1952. 100 C12H
Bluegrass, carrots, cotton, flax, oats, peas, sugar beets, sunflower and watermelons.

1652. McKAY, R. Note on malformation of Sitka spruce due to drift from hormone weed killer. Irish Forest. 14(2): 98-99. Winter 1957. 99.8 Ir4.

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2,4-D as probable cause of "boxelder blight".

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2,4-D, 2,4,5-T, 2,4,5-TB and amitrole.

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Description of a specific case of 2,4-D plus 2,4,5-T damage to shade trees during roadside spraying.

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German summary.

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Injuries.

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Includes diphenatrile, calcium propyl arsonate, dipropalin and bandane.

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Includes simazine, G-30031, G27901, and dalapon injury.

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Loblolly pine, turkey oak, sweetgum, and red maple.

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Effects of monuron, TCA, and fenuron in a drainage channel on plants (especially willow and birch) along the banks.

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Simazine, DCPA, EPTC, 2,4-D, and 2,4,5-T.

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Red pine and white pine.

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Tolerance to DCPA, amine methylarsonate, calcium arsenate, calcium propylarsonate, diphenatrile, dipropalin, DMA, DMPA, polychlorobicyclopentadiene isomers and trifluralin.

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Thesis (Ph.D.) - Kansas State University.
Toxicity of DCPA, AMA (ammonium methyl arsenate), DMPA, diphenatrile, CPA (calcium propyl arsenate), DSMA, dipropalin, calcium arsenate, Bandane and trifluralin.
In Diss. Abstrs. 25(3):1454. Sept. 1964. 241.8 M58.

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Bandane, diphenatrile, trifluralin and R-4461 (bensulid).

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English summary.
IPC, 2,4-D, and sesone.

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Effects of DAC 893, EPTC, atrazine, simazine, propazine, G34696, DMPA, DNBP, diphenatrile, trifluralin, dipropalin, diphenamid, casoron, H7531, amiben, TD66, and R1856 on boxwood, juniper, wax privet, and other ornamental plants.

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CDAA, CDEC, EPTC and simazine.

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Dacthal, DMPA, DSMA, chlordane, diphenatrile, and diphenamid.

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Effects on bulbs of simazine, CIPC, diuron, neburon, fenuron, and CIBA 1983.

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English summary.
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English summary.
Various ornamental plants.

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Prometryne, trifluralin, EPTC + 2,4-D, dichlobenil, and amiben.

1681. WATERS, W. E. Tolerance of Chrysanthemum morifolium to several herbicides. Southern Weed Conf. Proc. 18:246-249. 1965. 79.9 So8
Phytotoxic herbicides include dichlobenil, diphenamid, diuron, Emid (2,4-dichlorophenoxyacetamide), linuron, neburon, prometryne, solan and simazine.

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Dichlobenil, DCPA, diphenamid, diuron, Emid (2,4-dichlorophenoxyacetamide), EPTC, linuron, PEBC, sesone, simazine and trifluralin.

1683. WINGET, C. H., KOZLOWSKI, T. T., and KUNTZ, J. E. Effect of herbicides on red pine seedlings and transplants. Forestry Res. Notes 69, 5 p. May 1961. 99.8 F76292
Simazine, atrazine, NPA, sesone, CDAA, CDEC, propazine, simetone, G-30026 and EPTC.

1684. WINGET, C. H., KOZLOWSKI, T. T., and KUNTZ, J. E. Effects of herbicides on red pine nursery stock. Weeds 11(2): 87-90. Ref. Apr. 1963. 79.8 W41
Atrazine, simazine, G-30026, propazine, simetone, NPA, sesone, CDAA, CDEC, and EPTC.

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Atrazine and propazine tested on fir and pine.

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Dalapon and simazine on Scotch pine, spruce, larch, Douglas-fir, red beech, and maple.

Miscellaneous economic plants

1687. ABRAHAM, P. D., and BOATMAN, S. G. The influence of formulation on yield response and bark damage following the application of yield stimulants above the tapping cut. Rubber Res. Inst. Malaya J. 18(4):211-225. Ref. 1964. 79.9 R824J
2,4-D and 2,4,5-T formulations.

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2,4-D toxicity to tobacco.

1689. HAVIS, J. R. Injuries to coffee trees caused by herbicides. (Sp) Turrialba 2(4):170-171. Oct./Dec. 1952. 8 T86
2,4-D, TCA, and monuron.

1690. KASASIAN, L. The effect of herbicides on seedling rubber. Pesticides Abstr. & News Sum. Sect. C 8(3):190. July 1962. 79.9 G792
Atratone, ametryne, prometryne, atrazine, simazine, prometone, diuron, fenac, dalapon, and TCA.

1691. KATES, A. H. A note on damage to tobacco by lateral movement of picloram. Neast. Weed Contr. Conf. Proc. 19:393-396. 1965. 79.9 N814
Irrigation from watershed right-of-way into farm ponds.

1692. NAUNDORF, G. Herbicides in cacao. Cacaeo en Colombia 2:21-26. 1953. 68.38 C112
Effects of 2,4-D and DNC on flowering and fruiting.

1693. NAYLOR, A. W. Observations on the effects of maleic hydrazide on flowering of tobacco, maize and cocklebur. Nat. Acad. Sci. Proc. 36(4): 230-232. Apr. 1950. 500 N21P.

1693A. ORSENIGO, J. R. and others. Systematic foliage distortions in coffee attributed to 2,4-D. Turrialba 3(3): 100-101. July/Sept. 1953. 8 T86
Segall, R. H., Smith, O. and Wellman, F. L., joint authors.

1694B. SIMONS, T. J., and ROSS, A. F. Effect of 2,4-dichlorophenoxyacetic acid on size of tobacco mosaic virus lesions in hypersensitive tobacco. (Abstr.) Phytopathology 55(10):1076-1077. Oct. 1965. 464.8 P56.

1695. WURGLER, W. Observations on the reaction of tobacco to the application of some herbicides. (Fr) Landwirt. Jahrb. der Schweiz. 73(6): 597-604. Nov. 1959. 17 L23
English summary.
Includes 2,4-D, MCPA, MCPB and trietazine.
Also in Rev. Int. des Tabacs 35(325):55, 57-59. Mar. 1960. 69.8 R324.

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**Registered trade mark.

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2-Chloro-4-ethylamino-6-methoxypropylamino-s-triazine, ... 1672

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2-Chloro-4-isopropylamino-6-methylamino-s-triazine, ... 1497, 1588, 1683, 1684

4-Chloro-2-methylphenoxyacetic acid use 2-Methyl-4-chlorophenoxyacetic acid.

N-(3-Chloro-4-methylphenyl)-pentane carbonamide-2 use Solan.

Chlorophenols, ... 117

o-Chlorophenol-sulfonyl fluoride, ... 783

Chlorophenoxy compounds, ... 133, 150, 308, 1020, 1247

4-Chlorophenoxyacetic acid, ... 1279, 1364, 1371, 1386, 1438

Chlorophenoxyacetic acids 209, 308, 461, 462

**Registered trade mark.

4-(4-Chlorophenoxy)butyric acid, ... 1265, 1347

N-4-(p-Chlorophenoxy)phenyl-N,N-dimethylurea use Chloroxuron.

N-(3-Chlorophenyl)carbamate, ... 1624

3-(p-Chlorophenyl)-1,1-dimethylurea use Monuron.

3-(p-Chlorophenyl)-1,1-dimethylurea trichloroacetate use MonuronTCA.

Chloroxuron, ... 1339, 1368, 1676

Chlorpropham use Isopropyl N-(3-chlorophenyl)carbamate.

CIBA 1983 use Chloroxuron.

CIPC use Isopropyl N-(3-chlorophenyl)-carbamate.

Clobber** use Cypromid.

CMPP use Mecoprop.

CMU use Monuron.

Copper compounds, ... 29, 260, 280

Copper EDTA use Copper ethylenediaminetetraacetate.

Copper ethylenediaminetetraacetate, . . . 687

Copper naphthenate, ... 294

Copper sulfate, ... 129, 130, 220, 280, 290, 310, 548, 555, 579, 581, 585, 590, 594, 606, 628, 629, 634, 636, 638, 658, 674, 684, 687, 691, 933

CP-17029 use 2,4-Bis[(3-methoxypropyl)-amino]-6-(methylthio)-s-triazine.

CPA use Calcium propanearsonate.

4-CPB use 4-(4-Chlorophenoxy)butyric acid.

Crag herbicide, Crag 1** use Sesone.

Cresol, ... 622

Crotilin use 2,4-D, alpha-chlorocrotyl ester.

Crotonaldehyde, ... 74

Crotylin use 2,4-D, alpha-chlorocrotyl ester.

**Registered trade mark.

Cuprous oxide, ... 262

Cyanamid, Cyanamide use Calcium cyanamide.

Cycluron, ... 1077

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2,4-D, S-Ethyl di-N,N-propylthiolcarbamate mixture, ... 1680

2,4-D, 2,4,5-T mixture, ... 1655

2,4-D derivatives, ... 20, 146, 149, 154, 263, 326, 465, 467, 475, 476, 495, 515, 569, 588, 643, 647, 656, 749, 775, 826, 846, 855, 863, 867, 880, 897, 898, 962, 970, 989, 1008, 1084, 1085, 1110, 1121, 1133, 1141, 1148, 1151, 1173, 1185, 1252, 1282, 1349, 1430, 1514, 1555, 1617

2,4-D esters and salts use 2,4-D derivatives.

3,4-D, 3,4-DA use 3,4-Dichlorophenoxy-acetic acid.

DAC-893, Dacthal** use Dimethyl tetrachloroterephthalate.

Dalapon, ... 101, 149, 194, 213, 214, 216, 226, 227, 245, 266, 268, 415, 510, 138, 539, 546, 548, 552, 554, 555, 566, 586, 615, 620, 626, 632, 639, 665, 696, 720, 721, 730, 755, 781, 810, 819, 821, 823, 824, 825, 831, 838, 844, 854, 858, 867, 876, 880, 890, 903, 919, 927, 970, 977, 1019,

**Registered trade mark.

1061, 1104, 1105, 1114, 1124, 1134, 1145, 1187, 1190, 1196, 1201, 1214A, 1258, 1262, 1270, 1271, 1293, 1304, 1310, 1329, 1346, 1353, 1354, 1396, 1397A, 1405, 1414, 1419, 1421, 1426, 1451, 1479, 1485, 1486, 1495, 1505, 1540, 1544, 1571, 1628, 1660, 1677, 1686, 1690

DATC use Diallate.

2,4-DB, 4-(2,4-DB) use 4-(2,4-Dichlorophenoxy)butyric acid.

DCB use o-Dichlorobenzene.

DCMA use Dicryl.

DCPA use Dimethyl tetrachloroterephthalate.

DCU use Dichloral urea.

2,4-DEB use 2,4-Dichlorophenoxyethyl benzoate

DEF** use Tributyl phorphorotrithioate.

Delrad use Amine D acetate.

2,4-DEP use Tris(2,4-dichlorophenoxyethyl)-phosphite.

2,4-DES use Sesone.

Desmetryne, ... 1497

Dessicant L-10 use Arsenic acid.

Diallate, ... 760, 963, 970, 1002, 1013, 1073, 1385

Diallylacetamides, ... 264

2,6-Di-tert-butyl-p-tolyl methylcarbamate,. 1596, 1603, 1632

Dicamba, ... 52, 103, 361, 500, 556, 819, 970, 1168, 1346, 1632, 1678

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Dichlone, ... 548, 554, 555, 590, 638

Dichloral urea, ... 416, 417, 784, 816, 817, 1462, 1502, 1674

2,5-Dichloro-3-aminobenzoic acid use Amiben.

o-Dichlorobenzene, ... 977

2,5-Dichlorobenzoic acid, ... 1283

**Registered trade mark.

2,6-Dichlorobenzonitrile use Dichlobenil.

2,5-Dichloro-3-nitrobenzoic acid, ... 927, 1216, 1238, 1272

2,4-Dichlorophenol, ... 122, 123, 308

2,4-Dichlorophenol p-nitrophenyl ether, . . 67

2,4-Dichlorophenoxyacetamide, ... 1681, 1682

2,4-Dichlorophenoxyacetic acid use 2,4-D.

2,4-Dichlorophenoxyacetic acid salts and esters use 2,4-D derivatives.

3,4-Dichlorophenoxyacetic acid, ... 1371, 1386, 1407, 1438

4-(2,4-Dichlorophenoxy)butyric acid, . . . 195, 231, 249, 583, 602, 720, 721, 760, 1020, 880, 939, 969, 982, 1006, 1007, 1010, 1021, 1048, 1104, 1265, 1280, 1347, 1372, 1374, 1375, 1384, 1390, 1393, 1395, 1396, 1397A, 1397B, 1400, 1402, 1414, 1415, 1419, 1421, 1425, 1449, 1451, 1455, 1558, 1559, 1597

2,4-Dichlorophenoxyethyl benzoate, ... 1323

2,4-Dichlorophenoxyethyl sulfate use Sesone.

2,4-Dichlorophenyl "cellosolve" sulfate use Sesone.

N-(3,4-Dichlorophenyl) methacrylamide use Dicryl.

O-(2,4-Dichlorophenyl) O-methyl isopropyl-phosphoramidothioate, ... 100, 101, 344, 819, 970, 1360, 1596, 1601, 1603, 1608, 1609, 1614, 1632, 1634, 1665, 1666, 1668, 1672, 1675

3-(3,4-Dichlorophenyl)-1-methylurea, . . . 935

3,4-Dichloropropionanilide use Propanil.

2,2-Dichloropropionic acid and its sodium salt, use Dalapon.

2,6-Dichlorothiobenzamide, ... 1622

Dichlorprop, ... 616, 617, 725, 1010, 1013, 1048, 1484, 1518

Dicopur use 2,4-D.

Dicotex use 2-Methyl-4-chlorophenoxyacetic acid.

Dicryl, ... 819, 1025

Diesel oil, ... 813, 863

Diesel shale oil use Diesel oil.

2-(Diethylamino)-4-(isopropylamino)-6-
methoxy-s-triazine, ... 1497

Diethyl tetrathiobis(thionoformate), . . . 397

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Difernox use 2,4-D.

Dikonirt use 2,4-D.

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Dinoben** use 2,5-Dichloro-3-nitrobenzoic acid.

Dinoseb use Dinitrobutylphenol.

Diphenamid, ... 363, 421, 615, 1163, 1203, 1272, 1360, 1436, 1584, 1608, 1672, 1675, 1681, 1682

Diphenatrile, ... 1608, 1659, 1665, 1666, 1667, 1672, 1675

Dipropalin, ... 1596, 1659, 1665, 1666, 1672

Diquat, ... 88, 149, 240, 331, 538, 554, 572, 575, 615, 640, 665, 667, 668, 1353

Disodium endothal use Endothall.

Disodium-3,6-endoxohexahydrophthalic acid use Endothall.

Disodium methanearsonate, ... 906, 1534, 1614, 1636, 1665, 1666, 1675

Diuron, ... 265, 354, 415, 554, 582, 680, 725, 761, 819, 889, 935, 1077, 1086, 1104, 1105, 1172, 1229, 1233, 1239, 1267, 1270, 1293, 1303, 1310, 1317, 1330, 1341, 1344, 1346, 1352, 1354, 1355, 1356, 1451, 1459, 1490, 1491, 1498, 1505, 1512, 1521, 1534, 1540, 1541, 1543, 1545, 1546, 1551, 1588, 1589, 1591, 1622, 1627, 1628, 1648, 1676, 1681, 1682, 1690

DMA use Disodium methanearsonate.

DMPA use 0-(2,4-Dichlorophenyl) 0-methyl isopropyl-phosphoramidothioate.

DMTT use 3,5-Dimethyltetrahydro-2H, 1,3,5-thiodiazine-2-thione.

DNBP use Dinitrobutylphenol.

DNC, DNOC, DNOSBP, and its salts, use Dinitrobutylphenol.

DNPP use Dinitroisopropylphenol.

DNSBP and its salts use Dinitrobutylphenol.

**Registered trade mark.

Dodecylamine hydrochloride, substituted Ammonium compounds mixture.

Dowpon** use Dalapon.

2,4-DP, 2-(2,4-DP) use Dichlorprop.

DPA use 3,4-Dichlorophenoxyacetic acid.

DSMA use Disodium methanearsonate.

Dybar** use Fenuron.

Dymid** use Diphenamid.

E.H. No. 1 use Sesone.

E.H. No. 2 use Dichloral urea.

Emid use 2,4-Dichlorophenoxyacetamide.

Endothal** use Endothall.

Endothall, ... 45, 46, 47, 48, 50, 62, 75, 164, 167, 206, 287, 381, 499, 554, 584, 595, 614, 615, 638, 665, 667, 684, 685, 686, 687, 697, 734, 737, 816, 817, 976, 1116, 1251, 1252, 1303, 1463, 1465, 1496, 1575, 1624

Endothall, Isopropyl N-phenyl-carbamate mixture, ... 841

Endothall derivatives, ... 681, 689

3,6-Endoxohexahydrophthalic acid use Endothall.

Eptam** use S-Ethyl di-N,N-propylthiolcarbamate.

EPTC use S-Ethyl di-N,N-propylthiolcarbamate.

Erbitox use 2,4-D.

Erbon, ... 137, 343, 346, 1190, 1415, 1592

Erpan use 2,4-D.

Ervaxone use 2,4-D.

Ethyl carbamate, ... 365, 491

Ethyl-N,N-diisobutylthiolcarbamate, . . . 81

S-Ethyl di-N,N-propylthiolcarbamate, . . . 78, 79, 761, 854, 941, 963, 966, 1085, 1105, 1160, 1193, 1203, 1208, 1238, 1242, 1270, 1273, 1284, 1292, 1293, 1303, 1346, 1436, 1540, 1588, 1622, 1638, 1639, 1640, 1641, 1647, 1663, 1672, 1673, 1680, 1682, 1683, 1684

**Registered trade mark.

Ethylene glycol bis(trichloroacetate), . . 391

Ethyl phenylcarbamate, ... 1089

Ethyl urethane use Ethyl carbamate.

Experimental herbicide 732 use Terbacil.

Experimental herbicide 733 use 5-Bromo-3-tert-butyl-6-methyluracil.

F-98 use Acrolein.

Falone** use Tris(2,4-dichlorophenoxyethyl) phosphite.

Fenac, ... 87, 598, 614, 615, 640, 755, 819, 831, 941, 976, 1086, 1181, 1261, 1370, 1549, 1575, 1635, 1636, 1690

Fenuron, ... 309, 355, 505, 554, 582, 680, 730, 935, 1086, 1181, 1261, 1459, 1662, 1676

FenuronTCA, ... 305

Feoplat use Methylphenylcarbamate.

Ferbam, ... 590

Fermate** use Ferbam.

Folex** use Tributyl phosphorotrithioite.

Formaldehyde, ... 74

Furaldehyde use Furfural.

Furfural, ... 538

FW-925 use 2,4-Dichlorophenyl p-nitrophenyl ether.

G-27901 use Trietazine.

G-30026 use 2-Chloro-4-isopropylamino-6-methylamino-s-triazine.

G-30031 use Ipazine.

G-32292 use 2-Isopropylamino-4-methoxy-6-methylamino-s-triazine.

G-34360 use Desmetryne.

G-34361 use 2-Allylamino-4-chloro-6-isopropylamino-s-triazine.

G-34696 use 2-Chloro-4-ethylamino-6-methoxypropylamino-s-triazine.

**Registered trade mark.

G-36393 use 2-(Isopropylamino-4-[(3-methoxypropyl)-amino]-6-(methylthio)-s-triazine.

Glytac use Ethylene glycol bis(trichloroacetate)

H-1318 use Siduron.

H-7531 use Norea.

H-9573 use 2,6-Di-tert-butyl-p-tolyl methylcarbamate.

Halogenoalkylcarboxylic acid esters use Carboxylic acid compounds.

Hedolit use Dinitrocresol.

Herbicidal oils use Petroleum oils.

Herbicide No. 2 use Isopropyl N-phenylcarbamate.

Hexachlorophene use 2,2'-Methylene bis-(3,4,6-trichlorophenol).

Hoe-2747 use Monolinuron.

Hormit use 2,4-D derivatives.

Hungazin-DT use Simazine.

Hungazin-PK use Atrazine.

Hyamine, Hyamine 1622, Hyamine 2389, use Ammonium compounds, quaternary.

Hydrocarbons, ... 992, 1218, 1223

Hydrocarbons (aromatic), ... 1192

IAA, IES use Indoleacetic acid.

Indoleacetic acid, ... 974, 1122, 1557, 1560, 1613

Ioxynil, ... 218, 329, 782, 871, 1152, 1383

Ipatone use 2-(Diethylamino)-4-(isopropylamino)-6-methoxy-s-triazine.

Ipazine, ... 1497, 1638, 1643, 1660

IPC use Isopropyl N-phenylcarbamate.

Isocil, ... 265, 1326, 1341, 1346

2-Isopropylamino-4-methoxy-6-methylamino-s-triazine, ... 1497

2-(Isopropylamino-4-[3-methoxypropyl)-amino]-6-(methylthio)-2-triazine, ... 1596

Isopropyl N-(3-chlorophenyl)carbamate, . . 93, 112, 222, 295, 312, 413, 415, 418, 491, 545, 548, 552, 583, 614, 615, 725, 755, 772, 779, 784, 791, 838, 844, 863, 864, 867, 1111, 1140, 1172, 1177, 1187, 1196, 1234, 1235, 1238, 1239, 1242, 1251, 1261, 1269, 1277, 1281, 1291, 1303, 1323, 1339, 1379, 1401, 1413, 1432, 1437, 1438, 1439, 1442, 1443, 1451, 1456, 1462, 1481, 1490, 1493, 1498, 1502, 1505, 1521, 1522, 1535, 1538, 1540, 1541, 1543, 1545, 1548, 1551, 1556, 1584, 1588, 1590, 1591, 1622, 1624, 1627, 1628, 1644, 1677

Isopropyl N-phenylcarbamate, ... 93, 112, 182, 221, 312, 365, 378, 396, 418, 457, 459, 472, 491, 772, 779, 783, 816, 817, 838, 841, 867, 880, 963, 980, 981, 990, 1050, 1055, 1089, 1090, 1153, 1171, 1200, 1234, 1235, 1261, 1262, 1305, 1327, 1328, 1333, 1369, 1379, 1382, 1413, 1420, 1442, 1444, 1473, 1535, 1550, 1556, 1671

4K-2M use 2-Methyl-4-chlorophenoxyacetic acid.

Karmex DL use Diuron.

Karmex W** use Monuron.

Kerosene, ... 286

Kuron** use Silvex.

Kurosal G**, Kurosal S1** use Silvex.

Lead arsenate, ... 59, 93, 376, 486, 487, 1634, 1635, 1636

Lead compounds, ... 280

Linuron, ... 21, 265, 356, 1077, 1163, 1436, 1681, 1682

M 52 use 2-Methyl-4-chlorophenoxyacetic acid.

Magnesium chlorate, ... 335

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Maleic hydrazide diethanolamine, ... 825

**Registered trade mark.

MCP, MCPA use 2-Methyl-4-chlorophenoxyacetic acid.

MCPA esters and salts use 2-Methyl-4-chlorophenoxyacetic acid derivatives.

MCPB use 4-(2-Methyl-4-chlorophenoxy)-butyric acid.

MCPP, 2-(MCPP) use Mecoprop.

Mecoprop, ... 112, 199, 312, 993, 1005, 1010, 1013, 1033, 1159, 1258, 1296, 1302, 1632

Mercaptobenzothiazole, ... 415

Mercury compounds, ... 187

Methoxone** use 2-Methyl-4-chlorophenoxyacetic acid.

2-Methoxy-3,6-dichlorobenzoic acid use Dicamba.

2-Methoxy-3,5,6-trichlorobenzoic acid use Tricamba.

Methyl bromide, ... 49, 182

2-Methyl-4-chlorophenoxyacetic acid, . . . 32, 51, 155, 179, 182, 195, 196, 199, 210, 212, 217, 222, 233, 238, 247, 253, 261, 266, 269, 292, 312, 316, 419, 447, 455, 510, 514, 522, 546, 548, 552, 553, 583, 584, 586, 637, 639, 709, 711, 713, 717, 718, 720, 721, 728, 730, 732, 734, 735, 741, 745, 747, 751, 752, 757, 769, 775, 782, 785, 786, 811, 818, 832, 834, 856, 861, 862, 867, 878, 879, 880, 881, 882, 899, 910, 913, 928, 930, 947, 948, 949, 951, 955, 959, 970, 982, 987, 1005, 1010, 1011, 1013, 1020, 1021, 1027, 1033, 1034, 1042, 1052, 1054, 1058, 1059, 1063, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1074, 1077, 1081, 1088, 1089, 1090, 1092, 1095, 1098, 1104, 1106, 1107, 1128, 1129, 1130, 1146, 1150, 1157, 1159, 1161, 1169, 1170, 1227, 1234, 1235, 1256, 1258, 1279, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1347, 1371, 1372, 1374, 1377, 1378, 1380, 1381, 1382, 1384, 1386, 1389, 1392, 1397B, 1398, 1400, 1407, 1409, 1410, 1411, 1416, 1418, 1420, 1421, 1423, 1424, 1425, 1427, 1429, 1434, 1435, 1437, 1438, 1439, 1440, 1441, 1442, 1444, 1447, 1449, 1450, 1455, 1467, 1468, 1473, 1480, 1484, 1488A, 1489, 1507, 1514, 1517, 1519, 1520, 1537, 1542, 1544, 1550, 1558, 1559, 1573, 1586, 1695

*Registered trade mark.

2-Methyl-4-chlorophenoxyacetic acid derivatives, ... 1008, 1151, 1430

2-Methyl-4-chlorophenoxyacetic acid esters and salts use 2-Methyl-4-chlorophenoxy-acetic acid derivatives.

4-(2-Methyl-4-chlorophenoxy)butyric acid . 196, 782, 862, 905, 931, 969, 982, 1006, 1007, 1010, 1020, 1021, 1058, 1106, 1107, 1128, 1141, 1188, 1261, 1265, 1347, 1353, 1372, 1374, 1375, 1380, 1384, 1389, 1390, 1392, 1395, 1397B, 1384, 1389, 1390, 1392, 1395, 1397B, 1400, 1402, 1404, 1415, 1421, 1425, 1427, 1449, 1455, 1558, 1559, 1695

2-(2-Methyl-4-chlorophenoxy)propionic acid use Mecoprop.

1-(2-Methylcyclohexyl)-3-phenylurea use Siduron.

2,2'-Methylene bis-(3,4,6-trichlorophenol), ... 547

Methyl-1-naphthaleneacetic acid, ... 45, 47, 48

Methylphenylcarbamate, ... 459

1-Methyl-2-propynyl m-chlorocarbinalate, . 841, 1077, 1275, 1581, 1646

MG-T use 3-Oxypyridizone-6, triethanolamino salt.

MH use Maleic hydrazide.

Mineral oils, ... 1223

Molinate, ... 80, 1360, 1622

Monochloroacetate use Chloroacetic acid.

Monolinuron, ... 1229

Monuron, ... 112, 265, 312, 357, 390, 415, 539, 540, 546, 548, 552, 554, 555, 559, 582, 586, 626, 680, 684, 687, 725, 730, 768, 779, 781, 783, 791, 810, 844, 853, 863, 876, 927, 935, 983, 1050, 1086, 1111, 1116, 1135, 1153, 1172, 1174, 1177, 1181, 1187, 1190, 1195, 1196, 1202, 1214A, 1217, 1229, 1245, 1252, 1259, 1269, 1293, 1310, 1317, 1344, 1352, 1353, 1382, 1401, 1421, 1459, 1473, 1483, 1490, 1491, 1498, 1521, 1522, 1543, 1546, 1566, 1576, 1587, 1600, 1624, 1628, 1650, 1662, 1689

MonuronTCA, ... 306, 858

Murbetol use Endothall, Isopropyl N-phenylcarbamate mixture.

Mylone** use 3,5-dimethyltetrahydro-2H, 1,3,5-thiodiazine-2-thione.

NAA use Naphthalenacetic acid.

Naphthaleneacetic acid, ... 45, 974, 1560

N-1-Naphthylphthalamic acid, ... 23, 451, 923, 1172, 1203, 1312, 1214A 1259, 1263, 1270, 1271, 1281, 1286, 1293, 1436, 1532, 1540, 1551, 1554, 1683, 1684

Natrin** use Sodium 2,4,5-trichlorophenoxyethyl sulfate.

Neburon, ... 582, 680, 684, 687, 796, 1086, 1104, 1105, 1111, 1156, 1238, 1293, 1317, 1396, 1415, 1451, 1588, 1592, 1676, 1681

NES use Naphthaleneacetic acid.

Nigrosine, ... 666

Nitrates, ... 201, 217, 222, 223, 292, 297, 298, 299, 302,

Nitro compounds, ... 414

6-Nitro-2,5-dichlorobenzoic acid, ... 1283

Nitrophenols, ... 156

No-Crab use Calcium propanearsonate.

Norea, ... 1436

Novon use Erbon.

NP use N-1-Naphthylphthalamic acid.

NP-128 use o-Chlorophenol-sulfonyl fluoride.

NPA use N-1-Naphthylphthalamic acid.

Octyl 2,4-dichlorophenoxyacetate use 2,4-D derivatives.

Omazen, ... 554

OMU plus BiPC use Cycluron, 1-Methyl-2-propynyl m-chlorocarbanilate mixture.

Ordram** use Molinate.

Ortho Aquatic Weed Killer use Aromatic petroleum distillate.

3-Oxypyridizone-6, triethanolamino salt, . . 1674

Paraquat, ... 88, 149, 240, 330, 572, 575, 584, 696, 697, 1272, 1346, 1534, 1628

**Registered trade mark.

PBA use Polychlorobenzoic acid.

PCA use Pyrazon.

PCP, PCP sodium salt use Pentachlorophenol.

PEBC use Pebulate.

Pebulate, ... 83, 368, 1272, 1565, 1682

Penar** use Dimethyldodecylamine acetate.

Pentachloronitrobenzene, ... 279

Pentachlorophenol, ... 3, 45, 59, 65, 75, 92, 102, 110, 115, 117, 147, 168, 182, 189, 202, 229, 230, 237, 270, 271, 281, 282, 286, 294, 322, 425, 449, 473, 481, 489, 490, 496, 497, 516, 539, 541, 547, 551, 580, 586, 589, 593, 596, 615, 618, 669, 670, 671, 672, 673, 779, 797, 798, 816, 817, 896, 1030, 1036, 1050, 1062, 1163, 1277, 1281, 1285, 1462, 1550, 1554, 1624

Pentachlorophenolates use Pentachlorophenol.

Petroleum oils, ... 63, 182, 244, 615, 755, 892, 1224, 1306, 1523, 1524, 1661

Phenols, ... 133, 149, 622, 936, 1115

Phenoxy acids, substituted, ... 779

Phenoxy compounds, ... 49, 181, 256, 257, 779, 1469

1-Phenyl-4-amino-5-chloropyridazone-6 use Pyrazon.

Phenylcarbamic acid isopropyl ester use Isopropyl N-phenylcarbamate.

Phenyldimethylurea use Fenuron.

3-Phenyl-1,1-dimethylurea trichloroacetate use FenuronTCA.

Phenylmercuric acetate, ... 49, 93, 186, 187, 259, 371, 424, 458, 1064, 1277

Phenylmercuric hydroxide, ... 1064

Phenylmercuric nitrate, ... 170

Phenylmercuric triethanol ammonium lactate, ... 1064

Phenylmercury compounds, ... 1598

Phenyl urea compounds, substituted, ... 838

**Registered trade mark.

Phygon** XL use Dichlone.

Picloram, ... 30, 218, 251, 570, 889, 964, 970, 1077, 1346, 1388, 1428, 1678, 1691

Picloram derivatives, ... 251

Picolinic acid, ... 1632

Pielik use 2,4-D.

PMA use Phenylmercuric acetate.

Polybor chlorate use Borates, Chlorates mixture.

Polychlorobenzoic acid, ... 353, 684, 687, 821, 1513, 1549

Polychlorobenzoic acid dimethylamine salts, use Polychlorobenzoic acid.

Polychlorobicyclopentadiene isomers, . . . 266, 1596, 1601, 1603, 1608, 1614, 1632, 1659, 1665, 1666, 1667

Potassium chlorate, ... 291

Potassium cyanate, ... 892, 1177, 1277, 1598

Potassium nitrate, ... 288

Prefar** use Bensulide.

Prometone, ... 27, 683, 1497, 1596, 1690

Prometryne, ... 27, 1163, 1346, 1497, 1534, 1543, 1596, 1638, 1643, 1646, 1680, 1681, 1690

Propanil, ... 66, 70, 264, 819

Propazine, ... 27, 199, 683, 932, 1266, 1275, 1452, 1497, 1596, 1638, 1640, 1641, 1643, 1646, 1647, 1672, 1677, 1683, 1684, 1685

Propham use Isopropyl N-phenylcarbamate.

Propionaldehyde, ... 74

S-Propyl-n-butylethylthiocarbamate use Pebulate.

N-Propyl-dipropylthiolcarbamate use Vernolate.

Pyramin** use Pyrazon.

Pyrazon, ... 423, 503, 851, 1077, 1565, 1581

Quaternary ammonium compounds use Ammonium compounds, quaternary.

**Registered trade mark.

R-1607 use Vernolate.

R-1856 use S-tert-Butyl-dipropylthio-carbamate.

R-1910 use Ethyl-N,N-diisobutylthiol-carbamate.

R-4461 use Bensulide.

R-4572 use Molinate.

RADA use Amine D acetate.

Radapon** use Dalapon.

Rosin amine D acetate use Amine D acetate.

Rotenone, ... 699

S-847 use Barban.

SD-7961 use 2,6-Dichlorothiobenzamide.

SES use Sesone.

Sesone, ... 101, 110, 111, 328, 725, 783, 796, 816, 817, 852, 1062, 1111, 1202, 1271, 1277, 1292, 1323, 1328, 1333, 1337, 1338, 1347, 1360, 1436, 1442, 1540, 1552, 1553, 1588, 1590, 1600, 1624, 1627, 1671, 1682, 1683, 1684

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**Registered trade mark.

Simetone, ... 1292, 1497, 1683, 1684

Sinox** use Dinitrocresol.

Sodium acetate, ... 538

Sodium arsenate, ... 59, 327, 444, 471, 548, 1308

Sodium arsenite, ... 8, 59, 113, 176, 191, 203, 230, 242, 258, 276, 296, 317, 327, 471, 506, 514, 522, 527, 555, 557, 571, 572, 575, 576, 578, 590, 600, 624, 633, 657, 676, 684, 686, 687, 699, 1290

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Sodium chlorate, ... 43, 51, 133, 160, 182, 212, 235, 236, 239, 256, 392, 523, 539, 540, 548, 725, 792, 793, 810, 824, 876, 933, 1180, 1285, 1351

Sodium dichloroacetate, ... 507, 538

Sodium dichlorobutyrate, ... 696

Sodium 2,4-dichlorophenoxyacetate use, 2,4-D derivatives.

Sodium 2,4-dichlorophenoxyethyl sulfate use Sesone.

Sodium 2,2-dichloropropionate use Dalapon.

Sodium dinitrocresylate use Dinitrocresol.

Sodium fluoride, ... 548

Sodium metaborate, ... 392

Sodium methyldichlorophenoxyacetate use 2,4-D derivatives.

Sodium monochloracetate use Sodium chloroacetate.

Sodium PCP, Sodium pentachlorophenate use Pentachlorophenol.

Sodium TCA use Sodium trichloroacetate.

Sodium trichloroacetate, ... 140, 182, 345, 554, 646, 895, 1113, 1178, 1405, 1502

Sodium 2,4,5-trichlorophenoxyethyl sulfate, ... 101, 1196, 1241, 1243, 1271, 1291

Solan, ... 448, 1272, 1681

Stam F-34** use Propanil.

**Registered trade mark.

Stentan use Isopropyl N-phenylcarbamate, Triazine mixture.

Stoddard solvent, ... 850, 1174, 1251, 1259

Stull invert oil use Petroleum oils.

Sulfonyl fluoride, ... 783

Sulfuric acid, ... 133

Swep, ... 1203, 1272, 1622

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2,4,5-T derivatives, ... 1179, 1182, 1617

2,4,5-TB use 4-(2,4,5-Trichlorophenoxy)-butyric acid.

TBA, 2,3,6-TBA use 2,3,6-Trichlorobenzoic acid.

TCA use Trichloroacetic acid.

TCB use Trichlorobenzene.

Tenoran** use Chloroxuron.

Terbacil, ... 1341

2,4,5-TES use Sodium 2,4,5-Trichlorophenoxyethyl sulfate.

1,2,4,5-Tetrachlorobenzene, ... 957

Tetrachlorophenol, ... 117

Tillam** use Pebulate.

Tok** E-25 use 2,4-Dichlorophenyl p-nitrophenyl ether.

**Registered trade mark.

Tordon**, Tordon** 101 use Picloram.

2,4,5-TP** use Silvex.

2,2,3-TPA use 2,2,3-Trichloroproponic acid.

Treflan** use Trifluralin.

Triallate, ... 1002, 1385

Triazine, ... 1581

Triazines, ... 133, 149, 264, 266, 632, 683, 688, 1076, 1236, 1274

Tributyl phosphorotrithioate, ... 75, 333, 431

Tributyl phosphorotrithioite, ... 31, 332, 819

Tricamba, ... 103, 218, 361, 819

Trichloroacetic acid, ... 229, 230, 523, 545, 546, 548, 553, 626, 639, 641, 653, 680, 720, 721, 722, 763, 779, 781, 784, 792, 793, 810, 814, 816, 817, 824, 838, 844, 880, 928, 929, 939, 950, 1018, 1033, 1114, 1116, 1174, 1201, 1234, 1235, 1251, 1258, 1261, 1262, 1277, 1382, 1420, 1421, 1426, 1432, 1442, 1472, 1473, 1480, 1495, 1544, 1569, 1624, 1662, 1677, 1689, 1690

Trichloroacetic acid derivatives, ... 1109

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2,4,6-Trichlorophenoxyacetic acid, ... 1191

4-(2,4,5-Trichlorophenoxy)butyric acid, . 1265, 1347, 1654

2,4,5-Trichlorophenoxyethyl sulfate, . . . 1240

2,3,6-Trichlorophenylacetic acid use Fenac.

**Registered trade mark.

2,2,3-Trichloropropionic acid, ... 1505

Tricresyl phosphate, ... 337

Trietazine, ... 932, 941, 1266, 1660, 1695

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2-(Trifluoromethyl)-benzimidazoles, . . . 10, 399

2,3,5-Triiodobenzoic acid, ... 1102

Tris(2,4-dichlorophenoxyethyl) phosphite,. 24, 796, 1270, 1292, 1368, 1370

Tritac** use 2,3,6-Trichlorobenzyloxy-propanol.

Tupersan** use Siduron.

U 46 use 2,4-D.

Urab** use FenuronTCA.

Urea compounds, ... 133, 149, 632, 903

Urethane use Ethyl carbamate.

Urox** use MonuronTCA.

UT-10, UT10 Leuna use 2,4-D.

Vegadex** use 2-Chloroallyl diethyldithiocarbamate.

Vernam** use Vernolate.

Vernolate, ... 84, 1163, 1203, 1360, 1622

W 6658 use Simazine.

Weedex use 2-Methyl-4-chlorophenoxyacetic acid.

Weedone use 2,4-D.

Zinc sulfate, ... 629

Zytron** use O-(2,4-Dichlorophenyl) O-methyl isopropyl-phosphoramidothioate.

**Registered trade mark.

B. PLANTS AND ANIMALS

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Actinomycetales, ... 752

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